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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,155	02/11/2004	Arlic R. Conner	59526US002	3097
32692	7590	05/18/2006	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			DZIERZYNSKI, EVAN P	
			ART UNIT	PAPER NUMBER
			2875	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/776,155	CONNER, ARLIE R.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Evan Dzierzynski	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-22, 25-34 and 36-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-22, 25-34 and 36-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                    |                                                                             |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____                                                |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/31/2006</u> .                                                           | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-9 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Serizawa et al. (US Pat 47333356) in view of Tai et al. (US Pat 5506929) and Karasawa et al (US 2001/0033367).

3. With respect to claim 1, Serizawa discloses a light source module having an emitter that has a light-emitting surface (Fig. 8, item 111). Serizawa also teaches the pyramid collector having a proximal end (unnumbered) facing the surface and a distal end (unnumbered) facing away from the emitting surface. Serizawa fails to teach that the pyramidal collector is made of a substantially clear material mounted to the emitter over its emitting face and having sides that operate as simple reflectors. In a similar device, Tai et al. teaches a pyramidal collector 16 made of a substantially optically clear material (col 5, ln 65+, col 6, ln 4-6) having sides that operate as simple reflectors (col 5 ln 50+). It would have been obvious for one of ordinary skill in the art to combine the pyramidal reflector of Tai et al. and with the device of Serizawa in order to provide the

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device with a pyramidal collector that can eliminate the leakage of reflected light (col 5, In 55), thus creating total internal reflection. One would have been motivated to combine in order to provide a more efficient lighting device. Serizawa also fails to teach that the shape and size of the proximal end are different from the shape and size of the distal end. Karasawa et al. teaches a pyramidal reflecting device with the shape and size of the proximal end being different than that of the distal end (220, Fig 8). It would have been obvious for one of ordinary skill in the art to combine the pyramidal reflector with different shape and size ends of Karasawa et al. with the device of Serizawa in order to provide a tapered light guide with different size ends which allows the device to use a smaller projection lens and allow a bright image to be projected ( paragraph 0134, 0138).

4. With respect to claim 2, Serizawa discloses the proximal end of the pyramid collector is in contact with the light-emitting surface (Fig. 12).

5. With respect to claim 3, Serizawa shows that the proximal end of the pyramid collector has dimensions and shape that are approximately the same as dimensions and shape of the emitting surface (Fig. 12).

6. With respect to claim 5, Serizawa teaches the device as discussed above but fails to show that that the proximal end has a generally square shape and a distal end has a generally square shape and the distal end has a generally rectangular shape.

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Karasawa et al. teaches a proximal end with a generally square shape 226 and a distal end with a generally rectangle shape (222, Fig 8). See the discussion in regard to claim 1 for the motivation for combining.

7. With respect to claim 6, Serizawa discloses that the proximal end of the pyramid collector is fitted around the emitting surface (Fig. 12).

8. With respect to claim 7, Serizawa discloses that the light source module having a straight rectangular pipe section disposed adjacent to the distal end of the pyramid collector (Fig. 7, item 206).

9. With respect to claim 8, Serizawa discloses the light source module having a dome portion (Fig. 7, item 223).

10. With respect to claim 9, Serizawa discloses the light source further having a straight pipe portion disposed between the dome portion and the pyramid collector (Fig. 7, item 206).

11. With respect to claim 11, Serizawa discloses the distal end of the pyramid collector having a generally pincushioned configuration (150, Fig. 7).

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12. Claim 12 remains rejected for the reasons noted in the previous office action.

Applicant did not separately argue the rejection of the dependent claim.

13. With respect to claim 13, Serizawa discloses the distance between the proximal and distal ends of the pyramid collector is about 3 to 5 times longer than the largest diagonal of its distal end (if the minimum width of the distal end is 4.0 mm and the maximum length of the side is 18.0 mm, Col. 4, lines 50-52).

14. With respect to claims 14 and 15, Serizawa does not teach that the pyramid collector has sides that taper from about 2 to 6 degrees, and no more than about 10 degrees from the distal to the proximal end. Tai teaches the pyramid collector having sides that taper about 8 degrees will help to collimate light into a desired divergence range by reducing the divergence angle of the entry light ray (Col. 6, lines 43-52). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the pyramid collector having sides that taper about 8 degrees as taught by Tai in the pyramid collector of Serizawa so that the pyramid collector will help to collimate light into a desired divergence range by reducing the divergence angle of the entry light ray.

15. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Serizawa et al. (US Patent No. 4,733,355), Tai et al. (US Pat 5506929) and Karasawa

et al (US 2001/0033367), as applied to claim 8 above, and further in view of Yasumoto et al. (US Pat 4941072).

16. With respect to claim 10, Serizawa teaches the light source having a lens member that has a flange but does not teach the flange having the shape of a disk. Yasumoto teaches a light source having a lens (Fig. 3, item 4) with a disk shaped flange (44) disposed between the dome portion and the pyramid collector for the frame to hold the lens in place. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a lens having a flange with a disk shaped so that the flange will be hold by the frame to keep the lens in place.

17. Claims 16, 17, 19, 21, 22, 25, 26, 31, and 36-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Tiao et al. (US Patent No. 6,318,863 B1) in view of Tai et al. (US Pat 5506929).

18. With respect to claim 16, Tiao discloses an illumination system (Fig. 10) having a plurality of light source modules (1000a-c). Each light source module (Fig. 9B) has an emitter (902) that has a light-emitting surface (unnumbered). Tiao teaches pyramidal collectors 212 each pyramidal collector having a proximal end (912a) facing the emitting surface and a distal end (912b) facing away from the emitting surface. The illumination system also has an illumination target (960), and a system of optical elements (920,

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930, 940, and 950) disposed between the at least one light source module and the illumination target.

19. Tiao fails to teach that the pyramidal collector is made of a substantially clear material. In a similar device, Tai et al. teaches a pyramidal collector 16 made of a substantially optically clear material (col 5, ln 65+, col 6, ln 4-6) having sides that operate as simple reflectors (col 5 ln 50+). It would have been obvious for one of ordinary skill in the art to combine the pyramidal reflector of Tai et al. and with the device of Tiao in order to provide the device with a pyramidal collector that can eliminate the leakage of reflected light (col 5, ln 55), thus creating total internal reflection. One would have been motivated to combine in order to provide a more efficient lighting device. Tiao also teaches that the shape and size of the proximal end are different from the shape and size of the distal end (Fig 1).

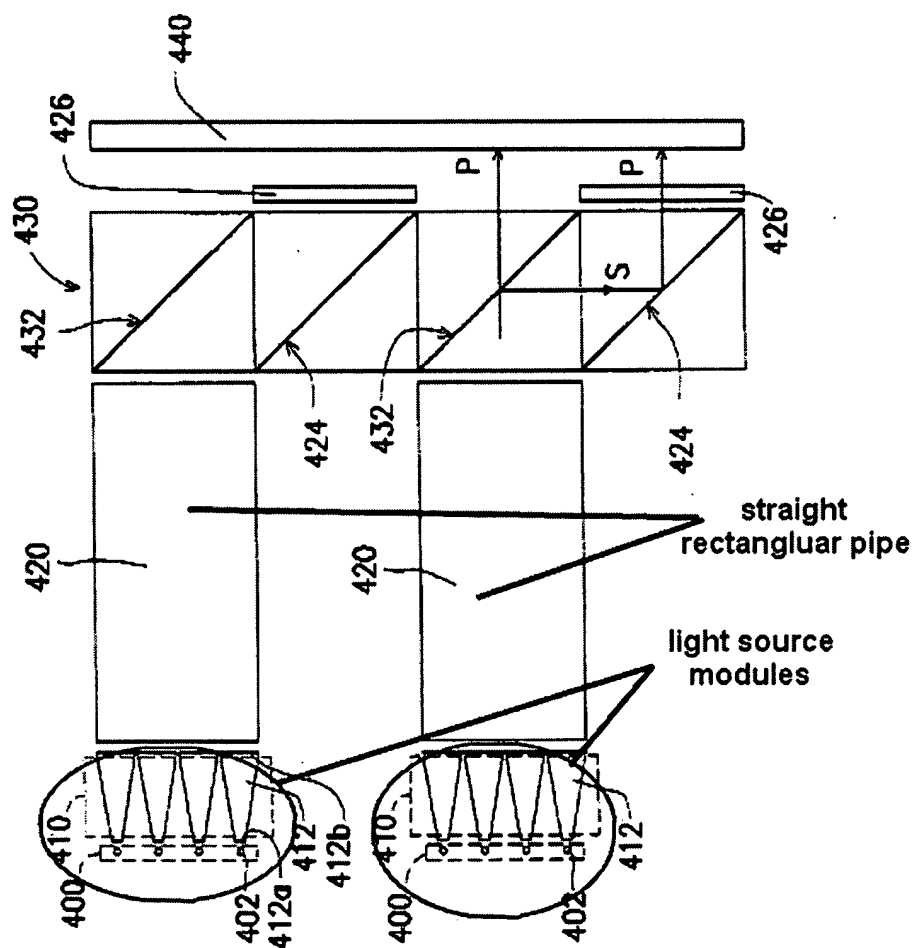
20. With respect to claim 17, Tiao discloses that the plurality of the light source modules is disposed in an array within a non-radially symmetrical aperture (Fig. 2B).

21. With respect to claim 19, Tiao discloses the light source modules (Fig. 3B, item 300) and the system of optical elements (Fig. 3B, items 320, 322, 324, 326, and 330) are configured to form a plurality of channels aimed substantially into the illumination target (340).



22. With respect to claims 21, 22, and 25, Tiao discloses the proximal end of each pyramid collector closely in connecting with each of the light emitting modules 202 so that the light emitted from each of the light emitting module 202 is collected by corresponding taper light pipe" (Col. 3, lines 11-15).

23. With respect to claim 26, Tiao discloses that each light source module has a straight rectangular pipe section (as indicated below in Fig 4B) disposed adjacent to the distal end of each pyramid collector (412).



24. Claim 31 remains rejected for the reasons noted in the previous office action.

Applicant did not separately argue the rejection of the dependent claim.

25. As for claim 36, Tiao teaches the device as discussed above but fails to teach that the proximal end of each pyramid collector has a generally square shape and the distal end has a generally rectangular shape. In a similar device, Tai et al. teaches a lighting apparatus with a pyramidal light collector with a generally square shaped proximal end and a rectangular shaped distal end (16, Fig 1). It would have been obvious for one of ordinary skill in the art to combine the pyramidal light collector of Tai et al. with the device of Tiao in order to improve the reflection of light through the device.

26. With respect to claim 37, Tiao discloses the system of optical elements is configured to image the distal end (Fig. 9B, 912b)) of each pyramid collector (912) onto the illumination target (960).

27. With respect to claims 38-40, Tiao discloses the images of the emitting surfaces are closely packed, overlapped, and substantially superimposed to form an illumination patch and the illumination patch substantially filled the illumination target (Fig. 9B, Col. 3 lines 41-43).

28. With respect to claim 41, Tiao discloses the shape of at least one of the distal ends of the pyramid collectors substantially matches a shape of the illumination target (Fig. 1A-B).

29. With respect to claims 42-43, Tiao discloses the shape of the illumination target is substantially square (Fig. 1A-B), where substantially square has the same meaning as substantially rectangular.

30. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al., and Tai et al, as applied to claim 16 above, and further in view of McClelland et al. (US Patent No. 6,201,629 B1).

31. With respect to claim 18, Tiao teaches an illumination system having a light valve such as an LCD as the image-forming device but does not teach the light valve having a plurality of mirrors rotatable about a pivot axis as the image-forming device.

McClelland teaches a torsional micro-mechanical mirror system, a type of light valve, that is useful for video display systems since it is compact in size and can produce high resolution images at rapid frame rates, having a mirror (Fig. 1, item 3) that is rotatable about a pivot axis (Fig. 2A, item 7). The aperture of the mirror has a long dimension and a short dimension (Fig.3) and is oriented so that the long dimension is aligned with the pivot axis of the mirrors of the image-forming device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the LCD light valve of Tiao with the torsional micro-mechanical mirror system of McClelland so that the size of the image generator of Tiao can be reduced, and produce high resolution images at rapid frame rates.

32. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1), and Tai et al., as applied to claim 19 above, and further in view of Anderson (US Patent No. 5,997,150).

33. With respect to claim 20, Tiao teaches the light source modules disposed on a flat substrate (Fig. 9B, item 200) but does not teach the light source modules disposed tangentially to and along a spherical surface. Anderson shows LED's are mounted tangentially to and along a spherical surface in figure 6 and figure 7, in order to reduce chromatic beam distortion from LEDs at the edges of the array. The light from each LED intersects and focuses at a common focal point F (Col. 6, lines 12-25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to mount the LEDs such that the light from each LED intersects and focuses at a common focal point as Anderson's illumination system in the illumination system of Tiao so that chromatic beam distortion from LEDs at the edges of the array can be reduced from Tiao's illumination system.

34. Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al., and Tai et al., as applied to claim 16 above, and further in view of Yasumoto et al. (US Patent No. 4,941,072).

35. With respect to claim 27, Tiao teaches the device as discussed above, but fails teach or disclose that each light source module has a dome portion. Yasumoto et al. discloses a light source module wherein each light source has a dome portion (4, fig 3). It would have been obvious for one of ordinary skill in the art to combine the dome portion of Yasumoto et al. with the device of Tiao in order to provide a means to better disperse the light from the light source.

36. With respect to claim 28, Tiao teaches the light source module having a lens at the distal end of a pyramid and further teaches the light source having a straight pipe portion 622 disposed between a lens portion 630 and a pyramid (612, Fig 6A).

37. With respect to claim 29, Tiao teaches the light source having a lens member that has a flange but does not teach the flange having the shape of a disk.

Yasumoto teaches a light source having a lens (Fig. 3, item 4) with a disk shaped flange (44) disposed between the dome portion and the pyramid collector for the frame to hold the lens in place.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a lens having a flange with a disk shaped so that the flange will be hold by the frame to keep the lens in place.

38. Claims 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al., and Tai et al, as applied to claim 16 above, and further in view of Serizawa et al. (US Patent No. 4,733,335).

39. With respect to claim 30, Tiao teaches the distal end of the pyramid collector is facing a light pipe but does not teach the distal end of the pyramid is facing a condenser lens.

Serizawa teaches a distal end of a pyramid collector that is facing a lens member (Fig. 7, item 206) and the lens member consists of condenser lenses (223) having a generally pincushioned configuration (Fig. 7). The condenser lenses effectively convert the light emitting diodes from point light to planar light sources (Col 4 line 68 to Col. 5 line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the condenser lenses having a generally pincushioned configuration as taught by Serizawa to the pyramid collectors of Tiao so that the pyramid collectors of Tiao can effectively convert the light emitting diodes from point light to planar light sources.

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40. With respect to claim 32, Tiao is silent about the size of the pyramid collector.

Serizawa teaches the diameter of the lens is substantially equal the diameter of the light emitting diode, and the length of the pyramid collector should be long enough to cover the length of the light emitting diode (minimum 4mm) but not too long (more than 18mm) since it would be more difficult to mold the condenser lens (Col. 4 lines 52-59).

Therefore, Serizawa teaches the distance between the proximal and distal ends of the pyramid collector is about 3 to 5 times longer than the largest diagonal of that pyramid collector's distal end (if the minimum width of the distal end is 4.0 mm and the maximum length of the side is 18.0 mm, Col. 4, lines 50-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the pyramid collector with the distance between the proximal and distal ends of the pyramid collector is about 3 to 5 times longer than the largest diagonal of that pyramid collectors distal end as taught by Serizawa for the pyramid collector of Tiao so that Tiao would not have a problem of molding the condenser lens.

41. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiao et al. (US Patent No. 6,318,863 B1) in view of Tai et al. (US Patent No. 4,733,335).

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42. With respect to claims 33 and 34, Tiao does not teach the pyramid collector having sides that taper from about 2 to 6 degrees, and no more than about 10 degrees from the distal to the proximal ends.

Tai teaches the pyramid collector having sides that taper about 8 degrees will help to collimate light into a desired divergence range by reducing the divergence angle of the entry light ray (Col. 6, lines 43-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the pyramid collector having sides that taper about 8 degrees as taught by Tai in the pyramid collector of Tiao so that the pyramid collector will help to collimate light into a desired divergence range by reducing the divergence angle of the entry light ray.

### ***Response to Arguments***

Applicant's arguments filed 3/2/2006 have been fully considered but they are not persuasive.

As for the arguments in regard to claim 1, Tai et al. has been combined under 35 U.S.C. 103(a) to address amended claim 1.

As for the arguments in regard to claim 5, Serizawa meets the claimed limitations because the distal end has a rectangular shape and the proximal end has a square shape (a square is a type of rectangle).

As for the arguments in regard to claim 11, the pincushion shapes are shown in Fig 8.



As for the arguments in regard to claim 16, figure 2A of Tiao et al. shows a plurality of light sources, each one along with a corresponding tapered light pipe 212. To move the light sources so that they are mounted on or touching the tapered light pipe is an obvious rearrangement of parts. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

As for the arguments in regard to claim 19, Applicant correctly points out that the light sources are aligned with each other, which means that they are all aimed in the same direction, the direction being substantially into the illumination target.

As for the arguments in regard to claim 26, see Fig 4B.

As for the arguments in regard to claim 27, Applicant correctly points out that 920 is an array of lenses.

As for the arguments in regard to claim 28, Tiao does in fact teach a light source module with a straight pipe portion between a dome portion and a pyramidal collector, when dome portion of Yasumoto et al. is combined with the device of Tiao.

As for the arguments in regard to claim 29, the applicant is advised that it has been held by the courts that differences in dimensions do not amount to patentability where such differences do not affect the operation of the prior art device. *In Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), in this case, the fact that the dimensions of the disk shaped flange of Yasumoto et al. may be different than that from Tiao does not mean that there is not a reasonable expectation of success. Changing the dimensions of part

of a device so that it can be physically combined with another is within the realm of one of ordinary skill in the art.

Applicant's arguments with respect to claims 30 and 32-34 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed in regard to claim 37 have been fully considered but they are not persuasive. Tiao does in fact disclose an illumination system that is configured to image the distal end of each pyramid collector onto the illumination target, as shown in figure 9B.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Donati (WO 95/10731) teaches a pyramidal reflector that has a proximal end a different shape and size as the distal end.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Dzierzynski whose telephone number is (571)-272-2336. The examiner can normally be reached on Monday through Friday 7:00 am - 3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Renee Luebke can be reached on M-F (571)-272-2009. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Evan Dzierzynski

4/25/2006



RENEE LUEBKE  
PRIMARY EXAMINER